

**Study Number:** C16019-01  
**Test Type:** TOX - Perinatal DRF  
**Route:** Dosing in Water  
**Species/Strain:** Rat/Harlan Sprague Dawley

**I05P: Pup Clinical Observations Summary**

**Test Compound:** Thallium (I) Sulfate

**CAS Number:** 7446-18-6

**Date Report Requested:** 01/13/2020

**Time Report Requested:** 15:39:35

**Lab:** Battelle

**C Number:**

C16019-01

**Study Gender:**

Female

**PWG Approval Date**

See web page for date of PWG Approval

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F1 Pups

Treatment Groups (mg/L)

|                                      | 0          | 3.13       | 6.25       | 12.5       | 25        |
|--------------------------------------|------------|------------|------------|------------|-----------|
| <b>Total Pups (PND 0)</b>            | <b>225</b> | <b>170</b> | <b>230</b> | <b>167</b> | <b>55</b> |
| <b>No. pups post cull (PND 4)</b>    | <b>180</b> | <b>164</b> | <b>186</b> | <b>159</b> |           |
| <b>Total Litters (PND 0)</b>         | <b>17</b>  | <b>12</b>  | <b>17</b>  | <b>12</b>  | <b>4</b>  |
| <b>No. litters post cull (PND 4)</b> | <b>14</b>  | <b>12</b>  | <b>14</b>  | <b>12</b>  |           |

Pup Clinical Observations PND 0-4

|                       |                                |                                |                               |                               |        |
|-----------------------|--------------------------------|--------------------------------|-------------------------------|-------------------------------|--------|
| Bruising<br>Abdomen   | 2 (0.9)<br>2 (11.8)<br>PND 1-4 | 3 (1.8)<br>3 (25.0)<br>PND 1-3 | 3 (1.3)<br>1 (5.9)<br>PND 1-3 | 1 (0.6)<br>1 (8.3)<br>PND 2-3 | 0<br>0 |
| Bruising<br>Dorsum    | 1 (0.4)<br>1 (5.9)<br>PND 1    | 0<br>0                         | 0<br>0                        | 0<br>0                        | 0<br>0 |
| Bruising<br>Head      | 0<br>0                         | 1 (0.6)<br>1 (8.3)<br>PND 2    | 1 (0.4)<br>1 (5.9)<br>PND 3   | 2 (1.2)<br>2 (16.7)<br>PND 1  | 0<br>0 |
| Bruising<br>Hind Limb | 0<br>0                         | 0<br>0                         | 0<br>0                        | 1 (0.6)<br>1 (8.3)<br>PND 1-2 | 0<br>0 |
| Bruising<br>Thorax    | 0<br>0                         | 1 (0.6)<br>1 (8.3)<br>PND 1-2  | 1 (0.4)<br>1 (5.9)<br>PND 1-2 | 0<br>0                        | 0<br>0 |

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F1 Pups

Treatment Groups (mg/L)

|                    | 0                   | 3.13               | 6.25                | 12.5              | 25                |
|--------------------|---------------------|--------------------|---------------------|-------------------|-------------------|
| Cold To Touch      | 0                   | 1 (0.6)            | 0                   | 0                 | 1 (1.8)           |
|                    | 0                   | 1 (8.3)<br>PND 3   | 0                   | 0                 | 1 (25.0)<br>PND 0 |
| Discolored         | 0                   | 0                  | 2 (0.9)             | 0                 | 0                 |
| Tip of Tail; Black | 0                   | 0                  | 2 (11.8)<br>PND 0-4 | 0                 | 0                 |
| Discolored         | 2 (0.9)             | 0                  | 0                   | 0                 | 0                 |
| Tip of Tail; Red   | 2 (11.8)<br>PND 1-4 | 0                  | 0                   | 0                 | 0                 |
| Milk Band Absent   | 0                   | 1 (0.6)            | 0                   | 0                 | 0                 |
| Abdomen            | 0                   | 1 (8.3)<br>PND 3   | 0                   | 0                 | 0                 |
| Missing            | 1 (0.4)             | 1 (0.6)            | 1 (0.4)             | 0                 | 0                 |
| Tip of Tail        | 1 (5.9)<br>PND 0-4  | 1 (8.3)<br>PND 0-4 | 1 (5.9)<br>PND 0-4  | 0                 | 0                 |
| Pale               | 1 (0.4)             | 1 (0.6)            | 2 (0.9)             | 2 (1.2)           | 1 (1.8)           |
|                    | 1 (5.9)<br>PND 1-3  | 1 (8.3)<br>PND 4   | 2 (11.8)<br>PND 1-4 | 2 (16.7)<br>PND 1 | 1 (25.0)<br>PND 0 |
| Scab               | 0                   | 0                  | 1 (0.4)             | 0                 | 0                 |
| Abdomen; Right     | 0                   | 0                  | 1 (5.9)<br>PND 2-4  | 0                 | 0                 |

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Treatment Groups (mg/L)

|                   | 0                  | 3.13 | 6.25               | 12.5               | 25 |
|-------------------|--------------------|------|--------------------|--------------------|----|
| Scab              | 0                  | 0    | 1 (0.4)            | 0                  | 0  |
| Face; Left        | 0                  | 0    | 1 (5.9)<br>PND 4   | 0                  | 0  |
| Scab              | 0                  | 0    | 1 (0.4)            | 1 (0.6)            | 0  |
| Face; Right       | 0                  | 0    | 1 (5.9)<br>PND 2-3 | 1 (8.3)<br>PND 2-3 | 0  |
| Scab              | 1 (0.4)            | 0    | 0                  | 0                  | 0  |
| Fore Limb; Left   | 1 (5.9)<br>PND 2-4 | 0    | 0                  | 0                  | 0  |
| Wound             | 0                  | 0    | 1 (0.4)            | 0                  | 0  |
| Abdomen; Right    | 0                  | 0    | 1 (5.9)<br>PND 0-1 | 0                  | 0  |
| Wound             | 0                  | 0    | 0                  | 1 (0.6)            | 0  |
| Head; Left        | 0                  | 0    | 0                  | 1 (8.3)<br>PND 1   | 0  |
| Wound             | 0                  | 0    | 1 (0.4)            | 1 (0.6)            | 0  |
| Nose/Snout; Right | 0                  | 0    | 1 (5.9)<br>PND 0-1 | 1 (8.3)<br>PND 0-1 | 0  |

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F1 Pups

Treatment Groups (mg/L)

0

3.13

6.25

12.5

25

Pup Clinical Observations PND 5-28

|                 |          |           |           |             |   |
|-----------------|----------|-----------|-----------|-------------|---|
| Alopecia        | 0        | 0         | 0         | 159 (100.0) | 0 |
|                 | 0        | 0         | 0         | 12 (100.0)  | 0 |
|                 |          |           |           | PND 18-28   |   |
| Bruising        | 0        | 0         | 0         | 1 (0.6)     | 0 |
| Abdomen         | 0        | 0         | 0         | 1 (8.3)     | 0 |
|                 |          |           |           | PND 8       |   |
| Bruising        | 2 (1.1)  | 1 (0.6)   | 0         | 0           | 0 |
| Head            | 1 (7.1)  | 1 (8.3)   | 0         | 0           | 0 |
|                 | PND 7-8  | PND 10-11 |           |             |   |
| Cold To Touch   | 1 (0.6)  | 6 (3.7)   | 1 (0.5)   | 3 (1.9)     | 0 |
|                 | 1 (7.1)  | 4 (33.3)  | 1 (7.1)   | 1 (8.3)     | 0 |
|                 | PND 10   | PND 5-10  | PND 8     | PND 5-7     |   |
| Damaged         | 1 (0.6)  | 0         | 1 (0.5)   | 0           | 0 |
| Tail            | 1 (7.1)  | 0         | 1 (7.1)   | 0           | 0 |
|                 | PND 7-28 |           | PND 19-28 |             |   |
| Discharge       | 0        | 2 (1.2)   | 0         | 0           | 0 |
| Eye; Red, Right | 0        | 2 (16.7)  | 0         | 0           | 0 |
|                 |          | PND 15-16 |           |             |   |

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F1 Pups

Treatment Groups (mg/L)

|                             | 0       | 3.13      | 6.25     | 12.5 | 25 |
|-----------------------------|---------|-----------|----------|------|----|
| Discharge                   | 0       | 1 (0.6)   | 0        | 0    | 0  |
| Eye; Right, Red             | 0       | 1 (8.3)   | 0        | 0    | 0  |
|                             |         | PND 18-19 |          |      |    |
| Discharge                   | 1 (0.6) | 0         | 0        | 0    | 0  |
| Nose/Snout; Bilateral, Red  | 1 (7.1) | 0         | 0        | 0    | 0  |
|                             | PND 24  |           |          |      |    |
| Discharge                   | 1 (0.6) | 0         | 0        | 0    | 0  |
| Nose/Snout; Red             | 1 (7.1) | 0         | 0        | 0    | 0  |
|                             | PND 7   |           |          |      |    |
| Discolored                  | 0       | 0         | 1 (0.5)  | 0    | 0  |
| Multiple Sites (>3); Yellow | 0       | 0         | 1 (7.1)  | 0    | 0  |
|                             |         |           | PND 8    |      |    |
| Discolored                  | 0       | 0         | 1 (0.5)  | 0    | 0  |
| Tip of Tail; Black          | 0       | 0         | 1 (7.1)  | 0    | 0  |
|                             |         |           | PND 5    |      |    |
| Discolored                  | 1 (0.6) | 0         | 2 (1.1)  | 0    | 0  |
| Tip of Tail; Red            | 1 (7.1) | 0         | 2 (14.3) | 0    | 0  |
|                             | PND 5-6 |           | PND 5-18 |      |    |
| Head Tilt                   | 0       | 1 (0.6)   | 0        | 0    | 0  |
|                             | 0       | 1 (8.3)   | 0        | 0    | 0  |
|                             |         | PND 10-14 |          |      |    |

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F1 Pups

Treatment Groups (mg/L)

|   | 0                               | 3.13   | 6.25                         | 12.5                         | 25     |
|---|---------------------------------|--------|------------------------------|------------------------------|--------|
| Lethargic                               | 1 (0.6)<br>1 (7.1)<br>PND 10    | 0<br>0 | 1 (0.5)<br>1 (7.1)<br>PND 11 | 0<br>0                       | 0<br>0 |
| Limping<br>Hind Limb; Mild              | 0<br>0                          | 0<br>0 | 0<br>0                       | 1 (0.6)<br>1 (8.3)<br>PND 10 | 0<br>0 |
| Limping<br>Hind Paw; Moderate           | 0<br>0                          | 0<br>0 | 1 (0.5)<br>1 (7.1)<br>PND 10 | 0<br>0                       | 0<br>0 |
| Mass<br>Abdomen; 1, Small (1-5mm), Left | 1 (0.6)<br>1 (7.1)<br>PND 17    | 0<br>0 | 0<br>0                       | 0<br>0                       | 0<br>0 |
| Mass<br>Abdomen; Left, Small (1-5mm), 1 | 1 (0.6)<br>1 (7.1)<br>PND 13-15 | 0<br>0 | 0<br>0                       | 0<br>0                       | 0<br>0 |
| Mass<br>Abdomen; Small (1-5mm), 1, Left | 1 (0.6)<br>1 (7.1)<br>PND 12-16 | 0<br>0 | 0<br>0                       | 0<br>0                       | 0<br>0 |
| Mass<br>Abdomen; Small (1-5mm), Left, 1 | 1 (0.6)<br>1 (7.1)<br>PND 18    | 0<br>0 | 0<br>0                       | 0<br>0                       | 0<br>0 |

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F1 Pups

Treatment Groups (mg/L)

|                               | 0                    | 3.13                  | 6.25                 | 12.5                | 25 |
|-------------------------------|----------------------|-----------------------|----------------------|---------------------|----|
| Mass                          | 0                    | 2 (1.2)               | 0                    | 0                   | 0  |
| Head; 1, Right, Small (1-5mm) | 0                    | 2 (16.7)<br>PND 12-15 | 0                    | 0                   | 0  |
| Mass                          | 0                    | 1 (0.6)               | 0                    | 0                   | 0  |
| Head; 1, Small (1-5mm), Right | 0                    | 1 (8.3)<br>PND 19-28  | 0                    | 0                   | 0  |
| Mass                          | 0                    | 1 (0.6)               | 0                    | 0                   | 0  |
| Head; Right, 1, Small (1-5mm) | 0                    | 1 (8.3)<br>PND 14-25  | 0                    | 0                   | 0  |
| Mass                          | 0                    | 1 (0.6)               | 0                    | 0                   | 0  |
| Head; Right, Small (1-5mm), 1 | 0                    | 1 (8.3)<br>PND 26-27  | 0                    | 0                   | 0  |
| Mass                          | 0                    | 1 (0.6)               | 0                    | 0                   | 0  |
| Head; Small (1-5mm), 1, Right | 0                    | 1 (8.3)<br>PND 16-18  | 0                    | 0                   | 0  |
| Mass                          | 0                    | 1 (0.6)               | 0                    | 0                   | 0  |
| Head; Small (1-5mm), Right, 1 | 0                    | 1 (8.3)<br>PND 20-22  | 0                    | 0                   | 0  |
| Milk Band Absent              | 4 (2.2)              | 8 (4.9)               | 4 (2.2)              | 7 (4.4)             | 0  |
| Abdomen                       | 3 (21.4)<br>PND 9-10 | 6 (50.0)<br>PND 5-8   | 4 (28.6)<br>PND 6-11 | 4 (33.3)<br>PND 5-8 | 0  |



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F1 Pups

Treatment Groups (mg/L)

|                        | 0                                | 3.13                             | 6.25                           | 12.5                            | 25 |
|------------------------|----------------------------------|----------------------------------|--------------------------------|---------------------------------|----|
| Missing                | 1 (0.6)                          | 1 (0.6)                          | 2 (1.1)                        | 0                               | 0  |
| Tip of Tail            | 1 (7.1)<br>PND 5-28              | 1 (8.3)<br>PND 5-28              | 1 (7.1)<br>PND 5-28            | 0                               | 0  |
| Pale                   | 0                                | 1 (0.6)<br>1 (8.3)<br>PND 10-11  | 0                              | 0                               | 0  |
| Scab<br>Abdomen; Left  | 2 (1.1)<br>2 (14.3)<br>PND 12-20 | 0                                | 0                              | 0                               | 0  |
| Scab<br>Abdomen; Right | 0                                | 0                                | 1 (0.5)<br>1 (7.1)<br>PND 9-11 | 1 (0.6)<br>1 (8.3)<br>PND 10-13 | 0  |
| Scab<br>Dorsum; Left   | 0                                | 1 (0.6)<br>1 (8.3)<br>PND 10-12  | 0                              | 0                               | 0  |
| Scab<br>Dorsum; Right  | 0                                | 1 (0.6)<br>1 (8.3)<br>PND 11-18  | 0                              | 0                               | 0  |
| Scab<br>Face; Right    | 0                                | 3 (1.8)<br>2 (16.7)<br>PND 10-17 | 1 (0.5)<br>1 (7.1)<br>PND 9-11 | 0                               | 0  |

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Treatment Groups (mg/L)

|                  | 0       | 3.13      | 6.25      | 12.5      | 25 |
|------------------|---------|-----------|-----------|-----------|----|
| Scab             | 0       | 1 (0.6)   | 0         | 0         | 0  |
| Face             | 0       | 1 (8.3)   | 0         | 0         | 0  |
|                  |         | PND 15-17 |           |           |    |
| Scab             | 1 (0.6) | 0         | 1 (0.5)   | 0         | 0  |
| Fore Limb; Left  | 1 (7.1) | 0         | 1 (7.1)   | 0         | 0  |
|                  | PND 5-6 |           | PND 13-17 |           |    |
| Scab             | 0       | 1 (0.6)   | 1 (0.5)   | 0         | 0  |
| Head; Right      | 0       | 1 (8.3)   | 1 (7.1)   | 0         | 0  |
|                  |         | PND 11-13 | PND 9-11  |           |    |
| Scab             | 0       | 1 (0.6)   | 0         | 1 (0.6)   | 0  |
| Head             | 0       | 1 (8.3)   | 0         | 1 (8.3)   | 0  |
|                  |         | PND 5-8   |           | PND 11-13 |    |
| Scab             | 0       | 0         | 1 (0.5)   | 0         | 0  |
| Hind Limb; Right | 0       | 0         | 1 (7.1)   | 0         | 0  |
|                  |         |           | PND 9-14  |           |    |
| Swelling         | 0       | 0         | 0         | 2 (1.3)   | 0  |
| Hind Limb; Left  | 0       | 0         | 0         | 2 (16.7)  | 0  |
|                  |         |           |           | PND 10-28 |    |
| Swelling         | 0       | 0         | 1 (0.5)   | 2 (1.3)   | 0  |
| Hind Limb; Right | 0       | 0         | 1 (7.1)   | 2 (16.7)  | 0  |
|                  |         |           | PND 11-12 | PND 5-9   |    |

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Treatment Groups (mg/L)

|                     | 0                            | 3.13                 | 6.25                         | 12.5                    | 25     |
|---------------------|------------------------------|----------------------|------------------------------|-------------------------|--------|
| Swelling            | 1 (0.6)                      | 2 (1.2)              | 0                            | 0                       | 0      |
| Nose/Snout          | 1 (7.1)<br>PND 7             | 1 (8.3)<br>PND 10-28 | 0                            | 0                       | 0      |
| Thin                | 1 (0.6)<br>1 (7.1)<br>PND 10 | 0<br>0               | 1 (0.5)<br>1 (7.1)<br>PND 11 | 0<br>0                  | 0<br>0 |
| Uneven Hair Growth  | 0                            | 0                    | 0                            | 159 (100.0)             | 0      |
| Multiple Sites (>3) | 0                            | 0                    | 0                            | 12 (100.0)<br>PND 11-24 | 0      |
| Wound               | 0                            | 0                    | 1 (0.5)                      | 0                       | 0      |
| Flank; Right        | 0                            | 0                    | 1 (7.1)<br>PND 7-8           | 0                       | 0      |
| Wound               | 0                            | 0                    | 1 (0.5)                      | 0                       | 0      |
| Head; Right         | 0                            | 0                    | 1 (7.1)<br>PND 8             | 0                       | 0      |
| Wound               | 0                            | 1 (0.6)              | 0                            | 0                       | 0      |
| Head                | 0                            | 1 (8.3)<br>PND 14    | 0                            | 0                       | 0      |
| Wound               | 0                            | 0                    | 0                            | 1 (0.6)                 | 0      |
| Hind Limb; Left     | 0                            | 0                    | 0                            | 1 (8.3)<br>PND 10-14    | 0      |

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**F1 Pups**

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**Treatment Groups (mg/L)**

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|                   | <b>0</b>             | <b>3.13</b> | <b>6.25</b>        | <b>12.5</b> | <b>25</b> |
|-------------------|----------------------|-------------|--------------------|-------------|-----------|
| Wound             | 0                    | 0           | 1 (0.5)            | 0           | 0         |
| Nose/Snout; Right | 0                    | 0           | 1 (7.1)<br>PND 7-8 | 0           | 0         |
| Wound             | 1 (0.6)              | 0           | 0                  | 0           | 0         |
| Thorax; Left      | 1 (7.1)<br>PND 11-12 | 0           | 0                  | 0           | 0         |
| Wound             | 0                    | 0           | 1 (0.5)            | 0           | 0         |
| Thorax; Right     | 0                    | 0           | 1 (7.1)<br>PND 7-8 | 0           | 0         |

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LEGEND

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Animals exhibiting clinical observations "within normal limits" were recorded as scheduled but are omitted from the table for clarity.

Upper row denotes the pup incidence N (%)

Middle row denotes the litter incidence N (%)

Lower row denotes the range of postnatal days the finding was seen for the group

F1 litter incidence based on the number of F0 dams; F2 litter incidence based on number of F1 dams.

No. live litters includes litters with  $\geq 1$  live pup

Percent incidence calculated using number of live pups or litters on PND 0 (pre cull) or PND 4 (post cull)

PND - Postnatal Day, pups pre-weaning

The litters in this study were not culled on PND 4, however, 3 and 3 litters in the 0 and 6.25 mg/L groups respectively were removed on PND4 for biosample analysis.

**\*\* END OF REPORT \*\***